

**IN THE CLAIMS:**

Please cancel claims 1-20 without prejudice and add the following new claims:

all  
11/17/00  
1 85. (New) A virtual reality generator to display abstract information as a multi-dimensional information terrain, the virtual reality generator comprising:

B<sup>2</sup>  
an input module receiving the abstract information from an information source, the information source generating the information as a function of a predetermined analysis of real-time and pre-stored data;

a user interface module including a first input selecting a categorical dimension for each of a first dimension of a multi-dimensional information terrain and a second dimension of the multi-dimensional information terrain and a second input for selecting a numerical dimension for a third dimension of the multi-dimensional information terrain, the user interface module selecting a portion of the abstract information as a function of the categorical dimensions and the numerical dimension; and

a virtual reality generator module coupled to the input module and the user interface module, the virtual reality generator generating, continuously modifying and displaying on a display device a multi-dimensional information terrain that enables a user to simulate movement through and interact with the abstract information, the information terrain representing selected portions of the information,

wherein when the user simulates movement through and interacts with the abstract information, the user viewing the display device has a sensation of traveling through and within the information terrain.

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86. (New) The virtual reality generator of claim 85, wherein the display device is a visual stereoscopic head-mounted display device.

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87. (New) The virtual reality generator of claim 85, wherein the selected portion of abstract information is displayed as a plurality of metaphors in the information terrain.

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88. (New) The virtual reality generator of claim 87, wherein the plurality of metaphors include geometric primitives.

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89. (New) The virtual reality generator of claim 87, wherein the plurality of metaphors include polygons.

B<sup>2</sup> 15  
90. (New) The virtual reality generator of claim 87, wherein the plurality of metaphors are rotatable.

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91. (New) The virtual reality generator of claim 87, wherein the plurality of metaphors have variable luminance.

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92. (New) The virtual reality generator of claim 87, wherein the user interface module further includes a third input for selecting at least one display dimension, and wherein at least a subset of the plurality of metaphors is displayed as a function of a predetermined one of the at least one display dimension.

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93. (New) The virtual reality generator of claim 87, wherein subset of the plurality of metaphors is selected to flash by a predetermined one of the plurality of display, each metaphor in the subset generated by the virtual reality module such that it flashes.

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94. (New) The virtual reality generator of claim 85, wherein the information terrain is updated at least 30 times per second.

4 ~~4~~ 95. (New) The virtual reality generator of claim ~~85~~, wherein the virtual reality generator module includes means for generating and simultaneously displaying a plurality of information terrains.

~~18~~ 96. (New) The virtual reality generator of claim ~~87~~, wherein the user interface module is operable to select one of the plurality of metaphors and wherein the virtual reality generator module is operable to display information relating to the selected one of the plurality of metaphors as a function of the at least one display dimension.

~~19~~ 97. (New) The virtual reality generator of claim ~~87~~ further comprising means for producing sounds relating to the selected one of the plurality of metaphors.

B<sup>2</sup> ~~22~~ 98. (New) A virtual reality generator to generate and display on a display device a stream of abstract information received from an analytic system, the virtual reality generator comprising:

an input module to continuously receive the stream of abstract information from the analytic system, the analytic system generating the abstract information as a function of a predetermined analysis on real-time and pre-stored data;

a user interface module having a first input for selecting a categorical dimension for each of a first dimension of a multi-dimensional information terrain and a second dimension of the multi-dimensional information terrain and a second input for selecting a numerical dimension for a third dimension of the multi-dimensional information terrain, the user interface module selecting a portion of the abstract information as a function of the categorical dimensions and the numerical dimension; and

a virtual reality generator module coupled to the input module and the user interface module, the virtual reality generator generating and displaying an information terrain on the display device, the information terrain being a multi-dimensional representation of the stream of the information displayable from a plurality of user selected perspectives to enable a user to simulate movement through the information terrain such that the user has a sensation of traveling

through and within the information terrain, the virtual reality generator module generating and continuously modifying the information terrain so that the information terrain correspondingly represents the stream of the selected portion of the information, causing the information terrain to be displayed on the display device, and simulating, on the display device, movement through the information terrain such that the user viewing the display device has a sensation of traveling through and within the information terrain.

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99. (New) The virtual reality generator of claim 98, wherein a view of the information terrain is generated by the virtual reality generator module at least 30 times per second, and wherein the virtual reality generator module updates the information terrain displayed on the display device at least 30 times per second.

B<sup>2</sup> 28  
100. (New) A virtual reality generator to display on a display device abstract information, the virtual reality generator comprising:

an input module to receive the abstract information as input, the abstract information including real-time data and pre-stored data;

a user interface module having a first input for selecting a categorical dimension for each of a first dimension of a multi-dimensional information terrain and a second dimension of the multi-dimensional information terrain and a second input for selecting a numerical dimension for a third dimension of the multi-dimensional information terrain, the user interface module selecting a portion of the abstract information as a function of the categorical dimensions and the numerical dimension; and

a virtual reality generator module coupled to the input module and the user interface module, the virtual reality generator generating and displaying an information terrain on the display device, the information terrain being a multi-dimensional representation of the selected portion of the abstract information continuously displayed from a plurality of user selected perspectives to enable a user to simulate movement through the information terrain such that the user has a sensation of traveling through and within the information terrain, the virtual reality generator module for generating the information terrain representing the selected portion of the

information, causing the information terrain to be displayed on the display device from a plurality of perspectives, and simulating, on the display device, movement through the information terrain such that the user viewing the display device has a sensation of traveling through and within the information terrain.

<sup>29</sup> 101. (New) The virtual reality generator of claim <sup>28</sup>100, wherein a view of the information terrain is generated by the virtual reality generator module at least 30 times per second, and wherein the virtual reality generator module updates the information terrain displayed on the display device at least 30 times per second.

<sup>30</sup> 102. (New) The virtual reality generator of claim <sup>28</sup>100, wherein the input module receives the information from a database of information.

<sup>31</sup> 103. (New) The virtual reality generator of claim <sup>28</sup>100, wherein the information is pre-processed by an analytic system prior to receipt by the input module.

<sup>32</sup> 104. (New) The virtual reality generator of claim <sup>28</sup>100, wherein the information is pre-processed by a fuzzy logic-based system prior to receipt by the input module.

<sup>33</sup> 105. (New) The virtual reality generator of claim <sup>28</sup>100, wherein the information is pre-processed by a neural network prior receipt by the input module.

<sup>34</sup> 106. (New) The virtual reality generator of claim <sup>28</sup>100, wherein the simulated movement is controlled by movement of a headset containing the display device.

<sup>35</sup> 107. (New) The virtual reality generator of claim <sup>28</sup>100, wherein the user interface module further includes a third input for selecting at least one display dimension, and wherein the

information terrain includes a plurality of metaphors, each one of the plurality of metaphors representing a subset of the selected portion of the abstract information.

36 ~~36~~ 108. (New) The virtual reality generator of claim ~~100~~ 28, wherein the display device is a monitor.

37 ~~37~~ 109. (New) The virtual reality generator of claim ~~100~~ 28, wherein the display device is a visual stereoscopic head-mounted display device.

38 ~~38~~ 110. (New) A virtual reality generator to display on a display device abstract information as an information terrain, the information terrain being an interface that enables a user to simulate movement through the abstract information, the virtual reality generator comprising:

an input module for receiving as input in real-time the abstract information from a source of abstract information, the source providing real-time and pre-stored data;

a user interface module having a first input for selecting a categorical dimension for each of a first dimension of a multi-dimensional information terrain and a second dimension of the multi-dimensional information terrain and a second input for selecting a numerical dimension for a third dimension of the multi-dimensional information terrain, the user interface module selecting a portion of the abstract information as a function of the categorical dimensions and the numerical dimension; and

a virtual reality generator module coupled to the input module and the user interface module, the virtual reality generator generating and displaying an information terrain on the display device, the information terrain being a multi-dimensional representation of the abstract information displayable from a plurality of user selected perspectives to enable a user to simulate movement through the information terrain such that the user has a sensation of traveling through and within the information terrain, the virtual reality generator module:

(i) generating, in real-time as the selected portion of the abstract information is received from the real-time data source of abstract information, the information terrain representing the abstract information,

(ii) displaying in real-time on the display device the information terrain representing the selected portion of the preprocessed information,  
(iii) displaying the information terrain from a plurality of perspectives, and  
(iv) simulating in real-time, on the display device, movement through the information terrain.

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111. (New) The virtual reality generator of claim 110, wherein the information terrain is updated at least 30 times per second.

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112. (New) The virtual reality generator of claim 110, wherein the virtual reality generator module generates and simultaneously displays a plurality of information terrains.

B<sup>2</sup> 41 38  
113. (New) The virtual reality generator of claim 110, wherein the selected portion of the abstract information is displayed as a plurality of metaphors in the information terrain.

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114. (New) The virtual reality generator of claim 113, wherein the virtual reality generator module includes means for selecting one of the plurality of metaphors and wherein the virtual reality generator module includes means for displaying information relating to the selected one of the plurality of metaphors.

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115. (New) A virtual reality generator, comprising:  
an input module to receive packets of abstract information at regular predetermined intervals, the abstract information being generated as a function of real-time and pre-stored data;  
a user interface module having a first input for selecting a categorical dimension for each of a first dimension of a multi-dimensional information terrain and a second dimension of the multi-dimensional information terrain and a second input for selecting a numerical dimension for the third dimension of the multi-dimensional information terrain, the user interface module selecting a portion of the abstract information as a function of the categorical dimensions and the numerical dimension;

a display driver coupled to the input module and the user interface module, the display driver for displaying on a display device an information terrain generated from the packets of the selected portion of the abstract information, the information terrain being a multi-dimensional representation of the packets of the selected portion of the data mining information continuously displayed from a plurality of user-selected perspectives to enable a user to simulate movement through and interact with the information terrain such that the user, when viewing the display device, has a sensation of traveling within the information terrain; and

a processor for updating the information terrain when a new packet of data mining information is received by the input module.

B<sup>2</sup> 116. (New) A computer-based method for displaying and manipulating large quantities of information, the method comprising the steps of:

receiving as input preprocessed abstract information, the preprocessed information being generated as a function of real-time and pre-stored data;

selecting a categorical dimension for each of a first dimension of a multi-dimensional information terrain and a second dimension of a multi-dimensional information terrain and a numerical dimension for the third dimension of a multi-dimensional information terrain;

selecting a portion of the information as a function of the categorical dimensions and the numerical dimension for display;

generating an information terrain from the selected portion of the information, the information terrain being a multi-dimensional representation of the information capable of being displayed from a plurality of user selected perspectives to enable a user to simulate movement through the information terrain; and

displaying on a display device the information terrain as the multi-dimensional interface that enables simulation of movement through and interaction with the information such that the user, when viewing the display device, has a sensation of traveling through and within the data mining information displayed as the information terrain.



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117. (New) A computer implemented method for displaying and manipulating information, the method comprising the steps of:

continuously receiving as input packets of the pre processed abstract information, the pre-processed information including real-time and pre-stored data;

selecting a categorical dimension for each of a first dimension of a multi-dimensional information terrain and a second dimension of the multi-dimensional information terrain and a numerical dimension for a third dimension of the multi-dimensional interface;

selecting a portion of the information as a function of the categorical dimensions and the numerical dimension for display;

generating an information terrain from the information, the information terrain representing the selected portion of the information and capable of being displayed from a plurality of perspectives to enable a user to simulate movement through the information terrain;

displaying the information terrain as a multi-dimensional representation on a display device such that a user can simulate movement through the information;

updating the information terrain on the display device when the selected portion of the information is received; and

simulating movement through the information terrain on the display device such that the user, when viewing the display device, has a sensation of traveling through and within the information terrain.

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118. (New) The virtual reality generator of claim 92, wherein the at least one display dimension displays the subset of the plurality of metaphors via one of a flashing, a spinning, a rotation, a shaping, a coloring and a texturing of the subset of the plurality of metaphor.

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119. (New) The virtual reality generator according to claim 85, wherein the information source is a financial analytic system.

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120. (New) The virtual reality generator according to claim 85, wherein the information source is a fuzzy-logic based system.

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121. (New) The virtual reality generator according to claim 85, wherein the information source is rule based expert system.

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122. (New) The virtual reality generator according to claim 85, wherein the information source is a neural network.

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123. (New) The virtual reality generator according to claim 85, wherein the abstract information is sports information.

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124. (New) The virtual reality generator according to claim 85, wherein the abstract information is defense information.

B<sup>2</sup> 11  
125. (New) The virtual reality generator according to claim 85, wherein the abstract information is legal information.

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126. (New) The virtual reality generator according to claim 98, wherein the analytic system is a financial analytic system.

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127. (New) The virtual reality generator according to claim 98, wherein the analytic system is a fuzzy-logic based system.

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128. (New) The virtual reality generator according to claim 98, wherein the analytic system is rule based expert system.

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129. (New) The virtual reality generator according to claim 98, wherein the analytic system is a neural network.